



This is a repository copy of *Elder homicide : a systematic literature review*.

White Rose Research Online URL for this paper:  
<http://eprints.whiterose.ac.uk/149938/>

Version: Accepted Version

---

**Article:**

Rogers, M.M. [orcid.org/0000-0002-7214-4375](https://orcid.org/0000-0002-7214-4375) and Storey, J.E. (2019) Elder homicide : a systematic literature review. *Aggression and Violent Behavior*. ISSN 1359-1789

<https://doi.org/10.1016/j.avb.2019.08.008>

---

Article available under the terms of the CC-BY-NC-ND licence  
(<https://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Reuse**

This article is distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND) licence. This licence only allows you to download this work and share it with others as long as you credit the authors, but you can't change the article in any way or use it commercially. More information and the full terms of the licence here: <https://creativecommons.org/licenses/>

**Takedown**

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing [eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk) including the URL of the record and the reason for the withdrawal request.



[eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk)  
<https://eprints.whiterose.ac.uk/>

### **Abstract**

This paper presents the findings of the first review of the research-based evidence reporting the phenomenon of elder homicide. A systematic review of peer-reviewed literature published across the world (between 1982 and 2018) was undertaken. A total of 33 articles were identified and appraised using PRISMA including quantitative ( $n=30$ ) and mixed methods ( $n=3$ ) studies. Four themes were identified in the synthesis of findings: victim characteristics; offender characteristics; victim-offender relationship; and offense characteristics. Through a critical discussion, these themes, and the emerging typology, are contextualised to argue that these findings could influence the improvement of policy and practice, and inform future research, for vulnerable elderly people at risk of violence and homicide. A gap identified in the literature was the lack of identification and analysis of risk factors for elder homicide which provides evidence of the need for further research on elder homicide, risk and risk management.

**Keywords:** elder abuse, eldercide, elder homicide, killings, murder

### **Elder homicide: A systematic literature review**

Demographic trends show that the global population aged 60 and over is growing faster than all younger age groups. Continued projected growth has been described as ‘unprecedented’, ‘pervasive’ and ‘enduring’ (United Nations, 2002, 2018). In the UK, for example, it is estimated that by 2040 nearly one in four people will be aged 65 or over and the number of people aged 85 or over is predicted to more than double to over 3.2 million (Office for National Statistics, 2017). There is a similar growth in the United States (US) with forecasts that by 2035, there will be more elderly people than children; with an estimated 78 million people aged 65 years and over compared to 76.7 million under the age of 18 (US Census Bureau, 2018). This projected trend is already the case in Japan which has the world’s most aged population with 33% aged 60 years or over (United Nations, 2015). These unrelenting trends will have considerable economic, political, cultural and social implications globally (United Nations, 2018).

Trends in homicide overall have shown that since the 1960s there was a steady increase in incidents (and at a faster rate than population growth) until the 1990s which brought a decline (Eisner, 2008; Weiss, Santos, Testa & Kuman, 2016; Tuttle, McCall, & Land, 2018). This pattern occurred in the US, Western Europe, Australia, Canada, and New Zealand (Eisner, 2008; Weiss et al., 2016; Tuttle et al., 2018). However, in a global study of homicide, it was found that homicide rates vary considerably between countries, and regions, making comparisons difficult overall (UNODC, 2013). In every country, however, the homicide of males was higher than that of females despite women being considerably more at risk of family and intimate partner violence (UNODC, 2013). When placing the lens on older populations, they are often invisible and subsequently elderly people have been depicted as a ‘hidden group’ in violence and homicide research, policy and practice (Rogers, 2016) and a

fragmented approach has led to misconceptions and a lack of understanding in this regard (Payne, 2002).

This lack of research coupled with the trends and forecasts related to the aging population present current and future challenges that will require focused research and nation states to prioritise policy review, resource allocation and service provision for older persons, particularly as they are identified as a group vulnerable to abuse (Buschmann et al., 2016; Rogers, 2016). Promisingly, research on elder abuse has increased in recent years, leading to a greater understanding of the victim and perpetrator characteristics that can lead to abuse. For example, victims of elder abuse compared to other elderly persons more often possess vulnerabilities such as cognitive and mental health problems, disabilities, and attitudes such as self-blame and stoicism that limit their help-seeking behaviour (Henderson, Buchanan, & Fisher, 2002; Johannesen & LoGiudie, 2013; Lachs & Pillemer, 2015). Perpetrators of elder abuse are more often afflicted with physical and mental health problems, including substance abuse, and are often dependent on the victim (Jackson, 2016; Johannesen & LoGiudie, 2013; Lachs & Pillemer, 2015). Understanding risk factors for elder abuse can help professionals to focus prevention efforts by identifying elderly individuals who are at risk of being abused and targeting treatment for perpetrators (Storey, in press).

Homicide is the most severe form of elder abuse and a comprehensive understanding and review of the risk factors for homicide would similarly help to prevent violence by guiding professional decision-making. Such a review does not exist and the empirical literature in the area is disparate over location, date of publication and content, making it difficult for any professional to interpret and apply in practice. Similarly, the lack of a review means that there is limited guidance for researchers as to where the gaps in knowledge currently reside in this area.

The consolidation of information on elder homicide is also important as in general there has been a tradition to homogenise the construct of homicide (Caman, Kristiansson, Granath & Sturup, 2017). This is problematic for various reasons as, indisputably, there are specific risk factors for violence and fatal outcomes that differ in accordance with different life stages. In later life, there can be decreased social connections, increased isolation along with reduced physical wellbeing, mental health and mobility to name a few (Caman et al., 2017). As such, elder homicide should be viewed and studied as a specific subcategory of elder abuse. Unfortunately, to date this category has been under-recognised and under-reported in practice contexts, as well as being mostly absent in the academic literature.

To enable an improved recognition and investigation of elder homicide, we need a more sophisticated understanding of victim, offender and relationship characteristics as well as a typology of offense characteristics. This knowledge holds potential for improving risk identification, assessment and management. As such, this paper presents a systematic review of empirical literature that explores elder homicide. In presenting this review the neglect or invisibility of older people's experiences in the violence and homicide literature is addressed, adding to the emerging body of work in this area (Buschmann et al., 2016; Rogers, 2016; Storey, in press). The following research questions were examined:

- a) What are the characteristics of elderly homicide victims (aged  $\geq 60$ )?
- b) What are the characteristics of offenders of elder homicide?
- c) What is the relationship between victims and offenders?
- d) What are the common offence characteristics of elder homicide?

## **Methods**

### **Overview**

This paper presents a systematic review of the global literature on elder homicide spanning the years 1982 to 2018. The aim of this review was to identify, appraise and synthesise research-based evidence in peer-reviewed articles that report findings on elder homicide. The principles contained within the SCIE: Systematic Research Reviews: Guidelines (Rutter et al., 2010) underpinned the design, search strategy and literature appraisal. The PRISMA 2009 Checklist (Moher, Liberati, Tetzlaff & Altman, 2009) provided a quality framework for reporting.

### **Definitions**

It is helpful to clarify the way in which the term ‘elder homicide’ is utilized as within homicide research there are various definitions and ways to measure ‘elderly’ (Addington, 2012). Throughout this paper, ‘elder homicide’ concerns the unjustifiable killing of a person aged 60 and over, recognising that the boundary of what is considered to be ‘older’ can begin at 50, 55, 60 or 65 dependent on the age range employed by a nation state, regional body or author (Addington, 2012; Orimo et al., 2006). This definition embraces a range of homicide types (domestic or intimate partner homicide, stranger homicide, and so on). This review will explore means and motive whilst noting how, within extant literature, some authors have adopted precise terms in ways to denote specific types of homicide. For instance, Soos (2000 as cited in Payne, 2006) identifies five types of elder homicides: *relief of burden killings* which occur when victims are considered to be a burden by the offender; *murder for profit killings* occur when offenders kill for some kind of benefit; *revenge killings* in which offenders seek out revenge for some reason (jealousy, hurt, betrayal for instance) on their victim; *gerontophilia*, an act which is sexually motivated; and *eldercide* which entails the killing of an elderly victim and it is underpinned by a prejudice against older persons.

### **Inclusion and Exclusion Criteria**

The inclusion and exclusion criteria are provided in Table 1 below. To comprehensively capture all empirical literature, a scoping search was undertaken to identify all relevant literature and test evidence (Rutter et al., 2010). Exclusion criteria were subsequently implemented pertaining to timeframes, sample size and methodology. Whilst acknowledging that within the homicide literature a consensus has emerged in terms of using age 65 and above as a measure of ‘elderly’, this consensus is dominated by studies located in the US. This review includes studies that employed 60 and above as a measure to be more inclusive of extant empirical knowledge in the analysis of characteristics from studies located across the globe; this applies to 11 studies in the final dataset. Results are not presented using a multi-category approach of elderly (e.g., 65-74 years of age being the ‘young old’, 75-84 years of age being ‘the aged’) due to the lack of consistency between the studies included in this review and problems thereof in analysing across studies that may or may not use multi-category definitions (Addington, 2012).

The data extraction strategy focused upon topic, relevance and quality (Rutter et al., 2009). Each article identified in the search ( $n=96$ ) was summarised using exclusion criteria to narrow down the selection. Inclusion and quality criteria (see below) were applied to further include or exclude studies resulting in the final selection that met all inclusion criteria ( $n=33$ ). The sample includes studies from a number of nation states including the US ( $n=15$ ), Turkey ( $n=5$ ), South Africa ( $n=3$ ), Japan ( $n=2$ ), Canada ( $n=1$ ), Germany ( $n=1$ ), Portugal ( $n=1$ ), Norway ( $n=1$ ), Australia ( $n=1$ ), India ( $n=1$ ) and multi-national studies ( $n=2$ ). Sources of data included national databases, or for city-based studies, a range of datasets were accessed including coroner’s office records and other official sources.

### **Search Strategy**

Several search strategies were employed to identify relevant articles. The final search was completed on 21 June 2018. Searches were conducted across the following databases:

PubMed; CINAHL; Web of Science; and Scopus. These search terms were used across all the databases: homicide/murder/eldercide and old\* people/old\* person\*/old\* adult/elder\*. As illustrated by the search terms, we sought to identify all empirical literature pertaining to elder homicide, not just domestic-related deaths (e.g., those resulting from intimate partner violence), but all homicide. Boolean operators and truncations helped to expand the search. Additional search strategies were undertaken including hand searching of abstracts, use of reviewers' knowledge of the literature and citation tracking. Hand searching of the electronic journal, *Homicide Studies*, was undertaken to increase the probability of finding relevant and up-to-date published material. All studies were screened against inclusion and exclusion criteria (Table 1). A PRISMA flowchart of the search strategy, results and application of inclusion/exclusion criteria can be seen in Figure 1.

### **Quality Appraisal**

An analysis was conducted of the existing evidence and an evaluation was completed on the quality of the research identified. The principles of the 'SCIE Systematic Research Reviews: Guidelines' (Rutter et al., 2010) provided the framework for the appraisal of each article. Each study was systematically reviewed to ensure that there was compliance with quality parameters in terms of clarity of aims, strength of design (sampling, methods), analysis (generalisability) and relevance.

### **Synthesis of Findings**

The final set of articles included 30 quantitative and 3 mixed methods studies. Synthesised findings are drawn from quantitative data only as findings using qualitative data were drawn from subsets that were too small from which to make generalisations. For each research question, survey data and findings were extracted and tabulated. These findings are informed by the adoption of narrative synthesis principles (Popay et al., 2006). Narrative synthesis explores words and text to extract and summarise data from both quantitative and



qualitative studies. Narrative synthesis enables the ordering and organisation of findings to describe patterns (see the discussion for a description of the patterns found in this review) (Rutter et al., 2010). To meet the review's objectives, search methods and the extraction of data was undertaken thematically (and the synthesis of findings is presented thematically). Techniques taken from thematic analysis (Braun & Clarke, 2006, 2013) were adopted to sort and organise data in order to report the main evidence in relation to the different characteristics identified in the review's objectives. Based on the research questions, the results are therefore presented as four distinct themes: victim characteristics; offender characteristics; victim-offender relationship; and offence characteristics, and the section on offence characteristics is further divided into sub-themes which emerged in the thematic analysis: means; motive; location; homicide-suicide; elder abuse, neglect or domestic abuse; and multiple offenders.

### **Results**

#### **Victim Characteristics**

Victim characteristics were included in 23 of the studies. Less than half of these ( $n=10$ ) examined gender as well as age, whereas characteristics such as ethnicity ( $n=10$ ), marital status ( $n=2$ ), health ( $n=2$ ), disability ( $n=1$ ) and substance use ( $n=1$ ) were not routinely reported or analysed. Across the studies, where victim characteristics were reported, the difference in proportions of males and females among elderly victims were not statistically distinct (Abrams, Leon, Tardiff, & Sutherland, 2007; Buschmann et al., 2016; Carcach, James, & Grabosky, 1998; Falzon & Davis, 1997; Titterington & Reyes, 2010). For example, one study conducted in Australia reported the gender of victims to be 51% ( $n=84$ ) male, and 49% ( $n=80$ ) female (Carcach et al., 1998). Similarly, Buschman et al.'s (2016) study in Germany indicated that of the total number of victims, 48.4% ( $n=42$ ) were male and 51.6% ( $n=55$ ) were female. There was one report conducted in the city of Johannesburg, South Africa, that highlighted a higher proportion of elderly male homicide victims (77.4%) (Buthelezi et al., 2017). However, the

results illustrated that gender was strongly associated with offense characteristics: for instance, in the case of location, males were more likely to be killed in the street, females in their homes (see ‘Offense Characteristics’ below). Buthelezi et al.’s (2017) study is an outlier with respect to gender and highlights the influence of socio-cultural and political contexts as South Africa reports a high incidence of crime overall (Statistics South Africa, 2017).

When defining age categories or comparing age groups, comparisons for this review proved challenging as, across all the studies, various age categories were employed. For instance, whilst Addington (2013) employed a multiple-category framework, consisting of three categories of 65-74 (young old), 75-84 (aged), and  $\geq 85$  (oldest old), most studies adopted a single-category approach with a minimum age of  $\geq 60$  or  $\geq 65$  as inclusion criteria (Abrams et al., 2007; Block, 2013; Erel, Aydin-Demirag, & Katkici., 2011; Karbeyaz, Emiral, & Emiral, 2018). Nonetheless, some age-related findings were reported. In four studies most victims fell into the 60-74 years age range (Buschman et al., 2016; Buthelezi et al., 2017; Karbeyaz et al., 2018; Kumar & Verma, 2016) whereas five studies reported that victims had a mean age between 72-77 years (Coehler et al., 2010; Erel et al., 2011; Falzon & Davis, 1997; Krienert & Walsh, 2010; Safarik, Jarvis, & Nussbaum, 2000).

Using a lifecourse and intersectionality lens, gender differences were evident when older victim categories were compared to younger age groups with older female victimisation being more common (Abrams et al., 2007; Suffla & Seedat, 2016; Titterington & Reyes, 2010). For instance, Abrams et al. (2007) compared an elderly group ( $\geq 65$ ,  $n=400$ ) with a non-elderly group (18-64,  $n=11,450$ ) finding that the proportion of male victims was significantly lower in the elderly category (57.3%) compared to the non-elderly (86.3%), making elderly victims more likely to be female (42.7%) than their younger counterparts (13.7%). Similarly, in Krienert and Walsh’s (2010) study of 828 case files of victims aged  $\geq 60$ , victims aged  $\geq 80$  were more often female (25.3%) than male (14.3%).

Only 10 studies discerned victim groups by ethnicity. Seven of these found that victims were mostly White and more likely to be White than younger counterparts (Abrams et al., 2007; Block, 2013; Burgess et al., 2005; Koehler, Shakir, & Omalu, 2006; Krienert & Walsh, 2010; Safarik, Jarvis, & Nussbaum, 2002; Titterington & Reyes, 2010). Three studies found that elderly victims were mostly Black (Collins & Presnell, 2006; Stevens et al., 1999; Titterington & Reyes, 2010).

Limited attention was paid to social or health characteristics, however the two most frequently cited risk factors for elder homicide were social isolation and frailty/declining mobility (Abrams et al., 2007; Addington, 2013; Burgess et al., 2005; Collins & Presnell, 2006; Krienert & Walsh, 2010; Roberts & Willits, 2011; Shields, Hunsaker, & Hunsaker, 2005).

### **Offender Characteristics**

Across the literature, there was a notable dearth in describing offender characteristics as only 12 studies reported some limited observations in this regard including gender ( $n=5$ ), age ( $n=6$ ), ethnicity ( $n=4$ ), mental health ( $n=3$ ) and criminal history ( $n=4$ ). When accounting for gender, offenders were predominantly male (Buschmann et al., 2016; Coelho, Ribeiro, Dias, Santos, & Magalhães, 2010; Collins & Presnell, 2006; Krienert & Walsh, 2010). For example, in Buschmann et al.'s study in Germany, of 55 cases, 83.6% of offenders were male and in Coelho et al.'s study of 37 cases in Portugal, 95% of offenders were male. There was only one anomaly in this regard, Titterington and Reyes' (2010) analysis of data from three large US cities found that the perpetrators of eldercide were more likely to be female, than in the case of younger victims (16.2% vs 10.2%).

Six studies reported findings related to offender age. Overall, most found that the mean age of offenders was considerably lower than that of the victims (Ahmed & Menzies, 2002; Buschmann et al., 2016; Krienert & Walsh, 2010; Safarik et al., 2000, 2002; Titterington & Reyes, 2010). For instance, in their analysis of 67 elder homicide offenders, Ahmed and

Menzies (2002) found the mean age to be 27.8 years, like Safarik et al. (2002) in their study of 732 homicides who found it to be 27 years. Two studies found slightly older offender ages with a mean of 46 years in Krienert and Walsh's (2010) analysis (total  $n=828$ ) and a mean age of 50 in Buschmann et al.'s (2016) study of 55 homicides.

Only four studies provided detail on offenders' ethnicity. Reflecting the challenges with comparison in this regard, studies reported divergent findings. For example, Krienert and Walsh (2010) reported that 70% of offenders in 828 eldercide cases were White, whereas Safarik's (2002) analysis of 732 records found that 41% of offenders were White. Stevens et al. (1999) found that victims and offenders were generally the same ethnicity and Titterington and Reyes (2010) found that eldercide offenders were more likely to be non-Hispanic White than the perpetrators of homicide with non-elderly victims (19% vs 9.8%).

Three studies sought to describe the mental health characteristics of offenders (Ahmed & Menzies, 2002; Burgess et al., 2005; Buschmann et al., 2016). In their study of elder homicide in the Canadian prairies, Ahmed and Menzies (2002) found that 14.6% of offenders ( $n=901$ ) had received psychiatric treatment before the offence took place, 1.5% had an Axis 1 diagnosis (this includes panic disorder, anorexia nervosa, social anxiety disorder, substance abuse disorders, bipolar disorder, bulimia nervosa and major depression), and 29.8% had a personality disorder. Buschmann et al. (2016) found that 40% of offenders ( $n=22$ ) had mental ill health and this appeared to be associated with their means of killing (tending to use sharp instruments or blunt force rather than any other method). In contrast, Burgess et al. (2005) found that offenders had mental health problems in only 4 of 26 cases.

Exploring criminal histories, Ahmed and Menzies (2002) found that just over a quarter (26.9%) of offenders (total  $n=67$ ) had a criminal record and 34.3% had been convicted for prior violent offences. Buschmann et al. (2016) found that of the available data on 55 homicides, young offenders (17-49 years) tended to have been convicted several times before the index

offence (no reports were made of older offenders). Safarik et al. (2002) found the highest rates of criminality (total homicides n=732), where 90% of offenders had a criminal history, 21% of which were prior sexual offences. Block (2013) found that offenders who committed sexual assault or were sexually motivated, targeted women, were male, were between 16-67 years and most often (71.4%) had a criminal record.

### **Victim-Offender Relationship**

Twelve studies reported on the relationship between the victim and the offender. Overwhelmingly, elderly homicide victims tend to be killed by somebody that they know (Block, 2013; Burgess et al., 2005; Buschmann et al., 2016; Coelho et al., 2010; Collins & Presnell, 2006; Falzon & Davis, 1997; Karbeyaz et al., 2018; Krienert & Walsh, 2010; Safarik et al., 2002; Stevens et al., 1999; Titterington & Reyes, 2010; Zhu et al., 2000). For example, in Buschmann et al.'s (2016) study of data of 55 elder homicides in Berlin, in 78.7% of homicides the victim knew the offender; in 46.7% homicides the offender was a family member (son, daughter, husband, grandson); the relationship was classed as a friendship in 20% of homicides; and 9.3% were locally connected (a neighbour for instance). Likewise, in their analyses of data from three large US cities, Titterington and Reyes (2010) found that elderly victims were more likely to be killed by intimate partners and other family members (31.8%) as compared to non-elderly victims (24.8%). However, intimate partners were the perpetrators in only 8.2% of those eldercides with the remaining 23.6% of homicides being committed by other family members. This is compared to 11.2% of homicides involving younger victims committed by intimate partners and 13.7% by other family members. Elderly victims were less likely to be killed by acquaintances and friends (33.9%) compared to non-elderly victims (46.8%).

There was some divergence across the studies, however, as Carcach et al.'s (1998) study of data from Australia found that there is a greater likelihood for older people to be killed by

strangers than is the case for younger victims, yet other studies did not find such clear patterns (for example, Falzon & Davis, 1997). What is evident is that older females are more likely to be killed by intimate partners or other family members, and older males by strangers or acquaintances (Krienert & Walsh, 2010). When comparing females by age group, however, elderly women are less likely than younger women to be killed in a domestic homicide where the offender is an intimate partner but more likely to be killed by a family member (Block, 2013; Burgess et al., 2005). Where reported findings diverged from these overall gender patterns, these were in studies reporting specific types of homicide. For example, Safarik et al. (2002) looked at two datasets and both had high incidences of sexual homicide (54% and 42%) perpetrated by strangers. This is a distinct form of killing and is not necessarily comparable to general elder homicides.

### **Offense Characteristics**

**Means.** A sizeable number of studies ( $n=22$ ) reported the means used to commit elderly homicide, with each study highlighting the same three most common causes of death: use of sharp instrument/stabbing; use of a firearm; and blunt force trauma. Just over half ( $n=12$ ) of the studies found that death by firearm was the most frequent and of those studies eight were located in the US, two in Turkey, one in South Africa and one in Germany (Addington, 2013; Buschman et al., 2016; Buthelezi et al., 2017; Chu & Kraus, 2004; Collins & Presnell, 2006; Falzon & Davis, 1997; Hilal, Akçan, Eren, Turhan, & Arslan, 2011; Karbeyaz et al., 2018; Koehler et al., 2006; Krienert & Walsh, 2010; Shields et al., 2005; Stevens et al., 1999). For those studies based in the US, there was less death by firearm in elder homicide cases compared to younger age groups and firearm usage decreased with age within the older group (Abrams et al., 2007; Block, 2013; Falzon & Davis, 1997; Stevens et al., 1999; Titterington & Reyes, 2010). Outside of the US and excluding the countries noted above, sharp force/stabbing was the most frequent homicide method used ( $n=5$ ) followed by blunt force trauma ( $n=4$ ) (Ahmed

& Menzies, 2002; Akar et al. 2005; Block, 2013; Burgess, Burgess, Koehler, Dominick, & Wecht, 2005; Carcach et al., 1998; Coelho et al., 2010; Timur et al., 2017; Titterington & Reyes, 2010; Zhu et al., 2010). Other methods of killing, described to varying degrees, included: beating/personal contact; strangling; asphyxiation; arson; drowning; and other unspecified means.

**Motive.** Twelve studies reported a broad range of motives for elder homicide. These included: felony-related; fight or argument-related; money-related; revenge; sexual assault; sexual jealousy; self-defence; mercy killings; and other. The presence of psychiatric illness, alcohol use and substance misuse were also reported as providing a rationale for homicide. Identified in several studies, was the increased likelihood of felony-related homicide (burglary, robbery, rape, etc.) in the case of elder victims compared to younger counterparts (Block, 2013; Burgess et al., 2005; Carcach et al., 1998; Chu & Kraus, 2004; Coelho et al., 2010; Roberts & Willits, 2011; Titterington & Reyes, 2010). Specifically, property crime (burglary) appeared to be a common motive of elder homicide (Ahmed & Menzies, 2002; Coelho et al., 2010; Collins & Presnell, 2006; Falzon & Davis, 1997). For example, Ahmed and Menzies (2002) compared incarcerated or paroled men in Canada, convicted of elder homicide, with those convicted of non-elderly homicide ( $n=901$ ) exploring victim, perpetrator and index-offence characteristics. The study found that most elderly victims (65.6%) were killed during a property crime whilst more non-elderly victims (74.3%) were killed during a domestic argument. The studies found that in felony-related incidents, offenders were variously described as strangers, family or acquaintances (Carcach et al., 1998; Collins & Presnell, 2006; Falzon & Davis, 1997; Roberts & Willits, 2011; Titterington & Reyes, 2010). Accounting for a high number of felony-related incidents in the home, Roberts and Willits (2011) suggests that during burglaries, felons might be more inclined to assault elderly victims. Similarly, other studies suggest that older victims

are at greater risk than their younger counterparts of dying during the incident due to physical vulnerability (Carcach et al., 1998).

The second most frequently cited motive was ‘argument-related’, but without further contextual information or clarity about the usage of definitional terms, it is difficult to report on this further. Other motives were reported to lesser degrees. For example, the presence of alcohol or substance misuse at the time of the homicide were less commonly reported in elder homicide cases (for either victims or offenders) compared to younger age groups and, in general, their presence was very rare for elder homicide (Abrams et al., 2007; Carcach et al., 1998; Erel et al., 2011; Krienert & Walsh, 2010). Indeed, Abrams et al. (2007) provided evidence that detection rates are substantially lower in elder homicide for illicit drugs (8.6%) and alcohol (20%) when compared to non-elderly cases (41.5% and 33.6% respectively).

**Location.** Twelve studies included the location of elder homicide with each one reporting that elderly homicide victims, particularly females, most often die in their own homes or other residential settings, with some articles highlighting that this occurs in a much higher frequency than for their non-elderly counterparts (Abrams et al., 2007; Ahmed & Menzies, 2002; Akar et al., 2006; Block, 2013; Buthelezi, Swart, & Seedat, 2017; Carcach et al., 1998; Chu & Kraus, 2004; Coelho et al., 2010; Collins & Presnell, 2006; Falzon & Davis, 1997; Karbeyaz et al., 2018; Krienert & Walsh, 2010). For example, Abrams et al. (2007) found that elderly victims ( $\geq 65$ ,  $n=400$ ) were more likely (66.3%) to be killed in their home than younger victims (aged 18-64,  $n=11,450$ ) (21.7%). Similarly, elderly victims (16%) were less likely than younger counterparts (46.1%) to be killed in public space (Abrams et al., 2007). In her study of elder homicide data in Chicago, Block (2013) found gender differences with 62% female victims (total  $n=512$ ) killed in their home compared to 36.1% of male victims (total  $n=1,228$ ).

**Homicide-suicide.** Five studies included instances of homicide-suicide within the analysed dataset (Abrams et al. 2007; Burgess et al., 2005; Buschmann et al., 2016; Coelho et



al., 2010; Falzon & Davies, 1998). However, one study was discounted as homicide-suicide cases were not distinguished from homicide cases (Abrams et al., 2007), and three others had very small samples and, therefore, did not offer useful or generalisable insights: Burgess et al., 2005,  $n=3$ ; Coelho et al., 2010,  $n=7$ ; Falzon & Davis, 1998,  $n=6$ ). In Buschmann et al.'s (2016) study, there were 16 homicide-suicides (29.1% of the dataset) and 5 (9.1%) offenders attempted suicide after homicide, no further context or analysis was proffered.

**Elder abuse, neglect and domestic abuse.** A small number of studies ( $n=3$ ) explored whether homicide victims had also been victims of elder abuse, neglect or intimate partner violence (Block, 2013; Burgess et al., 2005; Falzon & Davis, 1991). Block (2013) explored elder abuse in her US-based study of homicide data for the city of Chicago, focussing specifically on matricide and patricide (murder of a mother or father) finding that older victims ( $\geq 60$ ) are more likely to be killed by a child or grandchild than their younger counterparts. Of the 66 males and 59 females killed by a child or grandchild, 9 males (13.6%) and 13 females (22%) had been victims of elder abuse. Burgess et al. (2005) found that victims were less likely to have experienced domestic abuse compared to the younger victims whilst Falzon and Davis (1998) found low numbers ( $n=3$ ) but highlighted the problem of underreporting in this regard.

**Multiple offenders.** Only two studies identified cases with multiple offenders. In her analysis of the Chicago Homicide Dataset, Block (2013) found that for male victims, there was no discernible pattern but for female victims, they were more likely to be killed by multiple offenders, typically involving burglary or purse snatching by groups of young men. In Buschmann et al.'s (2016) study, in most cases a single victim was killed by a single offender, however, in 5 of 55 cases with available information, there were two or three accomplices.

## Discussion

Little is known about the characteristics of victims, offenders, their relationship, the offence, or the specificity of contexts for elder homicides. Currently, most empirical work on

elder homicide is rooted to a US context (Caman et al., 2017) and this presents a considerable gap as elder homicide is not well understood in different socio-cultural, political and geographical contexts. In addition, interpreting and comparing national and local datasets is challenging due to the diversity of measures and variables employed in the collection and analysis of data. Consequently, building a typology of victim, offender and offence characteristics is problematic. Notwithstanding, there are some useful insights to be gleaned from extant studies. For example, what is commonly illustrated across the literature is that both homicide rates and homicide risk decrease with age and most victims tend to be younger within the older age group; that is, from 60 to 75 years (Addington, 2013; Block, 2013; Carcach et al., 1998; Fox & Levin, 1991; Pampel & Williamson, 2001; Roberts & Willits, 2011). There are however two exceptions to this: Buthelezi et al.'s (2017) study shows comparable risk across the age groups; and Innamorati et al.'s (2014) analysis of homicides in Russia highlights increased risk of homicide for older age groups. Motives for elder homicide rates were offered inconsistently throughout the studies in this review, but it may be that decreased contact with others in later life may present one reason, or that elderly people are accommodated in care homes with professional, rather than family, care.

What is evident is that despite the small number of elder homicides overall, findings presented here illuminate the need to consider the characteristics of victims, not singularly, but in relation to other characteristics. For instance, the gender division of victim populations was not statistically significant in some studies, whilst others did not compare gender, opting to analyse either male or female victimisation. Thus, a claim about the typical gender of victims cannot be made in isolation. However, demographically there are more older females living in the home, and more elder homicides take place there. Subsequently, an aggregation of the findings reported throughout the literature suggests that elder homicides are more likely to take place in the home and involve female victims (Roberts & Willits, 2011). In addition, older

female victimisation is more prevalent in those studies that compared older and younger age groups (Abrams et al., 2007). Similarly, male victimisation is lower in older age groups compared with younger ones (Abrams et al., 2007). In terms of other victim characteristics, the studies showed that most victims are White but, again, a comparison across the studies is difficult due to the ethnic and racial diversity inevitably illustrated in the global literature as well as differences in relation to the demographic variations across large cities and regions.

A further conclusion that can be drawn from synthesising the findings of extant studies, relates to the characteristics of the offender and the relationship between offender and victim. Just over a third of the studies ( $n=12$ ) offered some limited insights in this regard constituting a modest contribution to the knowledge gap. These studies suggested that most offenders are male, younger than their older female victim (Ahmed & Menzies., 2002; Buschmann et al., 2016; Krienert & Walsh, 2010; Safarik et al., 2000, 2002; Titterington & Reyes, 2010) and, White. Except for one study (Roberts & Willits, 2011), victims were most often killed by someone that they knew (e.g., a family member or acquaintance).

Accordingly, a typology is beginning to form in which most victims are female and killed in the home by someone known to them. This provides the foundation of a typology with identified risk factors that implicate a heightened vulnerability to elder homicide. Surprisingly, however, very few studies in this review ( $n=8$ ) explicitly identified risk factors for elder homicide. The two most frequently cited were social isolation and frailty/declining mobility (Abrams et al., 2007; Addington, 2013; Burgess et al., 2005; Collins & Presnell, 2006; Krienert & Walsh, 2010; Roberts & Willits, 2011; Shields et al., 2005). These factors were described, but not analysed to any depth. Yet, both are logically linked to the risk factors identified herein because in combination older females who are less mobile, and therefore socially isolated, spending more time in their homes, interacting primarily with family members, present at a higher risk of elder homicide. This is congruent with earlier research (Messner & Tardiff,

1985). Consequently, the findings presented here draw attention to various implications; specifically, the need for a more sophisticated understanding of the relationship between socially isolated elders, their family and carers as this may offer further insights in terms of characteristics and risk factors. Although identified risk factors are currently still rare, the fact that some consistent differences between young and older victims have been identified suggests that domestic homicide reviews and serious case reviews should treat elderly cases as distinct and utilise population specific instruments to assess risk.

In terms of the risk and motive for elder homicide, this was frequently identified as felony-related with burglary and theft reported to be the most common motive and a felony perpetrated by both strangers and offenders known to the victim. As such, in a lifestyle characterised by vulnerability due to impairment, decreased activity and/or social isolation, a chief risk factor stems from being targeted as a felony victim in one's own home (Abrams et al., 2007). Frail and socially isolated older people are more vulnerable and may, therefore, be perceived to be easy targets who are less able to protect themselves (Weaver, Martin, & Petee, 2004). So, whilst social isolation, frailty and reduced mobility increase vulnerability, there are clear policy and practice implications in terms of home security and the potential for new technologies to address isolation, connectedness and increase safety (Carcach et al., 1998).

Additional risk factors were rarely considered but included cognitive impairment (e.g., dementia), living in close proximity to the abuser and having a history of past abuse (Shields et al., 2005). Attributes of individuals who undertake caregiving were highlighted as risk factors in two studies (Ahmed & Menzies, 2002; Shields et al., 2005) and included: psychiatric and psychological conditions; a history of violence or antisocial behaviour; alcohol and/or substance dependence; financial and/or emotional dependence. Although these victim and perpetrator risk factors have been empirically identified as risk factors for elder

abuse generally (Storey, in press), their specific association with elder homicide, the most severe outcome of elder abuse, has not been examined. The lack of identified risk factors for elder homicide reflects the knowledge gap and resultant dearth of policy and practice with regard to risk and elder homicide. Yet to design successful tools and interventions for risk assessment and management that reduce the risk of elder homicide victimisation such research is required.

Further to this, in order to properly examine elder homicide, research must examine different kinds of homicide using different lenses. For example, across the studies, Soos' (2000) five-part typology of elder homicide was identified but to varying degrees and only one study examined a specific type. Specifically, Safarik et al. (2000, 2002), explored sexual homicide with some clear distinctions in terms of victim, offender and offence characteristics that are unlikely to apply to other forms of homicide (e.g Safarik et al. found that the ethnicity of a victim was often different to the offender). As such, the limitations of existing evidence are highlighted by the range of samples and studies available. What is evident is that alongside a victim typology, offender and offence characteristics, what is currently missing is a matrix of risk factors and a more systematic examination of those risk factors across different forms of homicide. Both are needed in order to progress the ways in which policy and practice can help to prevent elder homicide. Moreover, the need for an evidence-based risk assessment tool or protocol is clear.

There are some common limitations in the interpretation of findings and comparison of studies presented in this paper; some are alluded to earlier, such as the variability in age categories and cut-offs. The studies reviewed are inconsistent in other ways, particularly in the variables examined and methodologies used. In addition, in many studies the methodology section lacked specificity (see Table 2) leaving unanswered questions about design and sampling. In the reporting of results, inevitably authors must make decisions

about what to include and what to omit, however some studies tended to report only partial results, leaving out results that may be of interest or that provide further detail and context. Similarly, aims and objectives varied considerably with some studies comparing elderly samples to non-elderly or other countries, and some offering mere descriptions with little context or analysis. The focus on victimhood or offenders varied also. Moreover, when studies did compare elderly to non-elderly populations, they varied in terms of the division into age sub-groups (see Addington (2013) for a detailed discussion on age group categories and the issues surrounding them).

### **Conclusion**

This review is the first of its kind and it provides an overview of extant knowledge in relation to elder homicide. This review was undertaken to identify and typify the common characteristics of victims, offenders, victim-offender relationships and offences. In doing so, gaps in the literature were identified as well as ways in which policy and practice could be improved through attention to the present results and further study. The aging population and severe outcomes of both elder abuse and homicide necessitate continued rigorous study and, therefore, the findings of this literature review underline a compelling need for a study that explores elder homicide, risk and risk management. In addition, future research could explore the barriers and enablers to the identification, assessment and management of risk of elder homicide as well as engagement from potential victims and their families and carers.

## References

- Abrams, R.C., Leon, A.C., Tardiff, K., Marzuk, P.M., & Sutherland, K. (2007). "Gray murder": characteristics of elderly compared with non-elderly homicide victims in New York City. *American Journal of Public Health, 97*(9), 1666-1670.
- Addington, L.A. (2012). Who you calling old? Measuring "elderly" and what it means for homicide research. *Homicide Studies, 17*(2), 134-153.
- Ahmed, A.G., & Menzies, R. (2002). Homicide in the Canadian prairies: Elderly and non-elderly killings. *Canadian Journal of Psychiatry, 47*, 875–879.
- Akar, T., Karapirli, M., Akcan, R., Demirel, B., Akduman, B., Dursun, A. Z., Sari, S., & Özkök, A. (2014). Elderly deaths in Ankara, Turkey. *Archives of Gerontology and Geriatrics, 59*, 398–402.
- Block, C. (2013). Homicide against or by the elderly in Chicago 1965-2000. *Homicide Studies, 17*(2) 154-183.
- Braun, V., & Clarke, V. (2006). Using Thematic Analysis in Psychology. *Qualitative Research in Psychology, 3*, 77-101.
- Burgess, A., Burgess, A.G., Koehler, S.A., Dominick, J. & Wecht, C.H. (2005). Age-based factors in femicide. *Journal of Forensic Nursing, 1*(4) 151-157.
- Buschmann, C.T., Lang, J.R. & Tsokos, M. (2016). Homicides in Older Adults in Berlin from 2000-2010. *European Journal of Forensic Sciences, 3*(1) 1-6.
- Buthelezi, S., Swart, L., & Seedat, M. (2017). The incidence and epidemiology of eldercide in the city of Johannesburg, South Africa. *Journal of Forensic and Legal Medicine, 52*, 82-88.

- Caman, S., Kristiannson, M., Granath, S., & Sturup, J. (2017). Trends in rates and characteristics of intimate partner homicides between 1990 and 2013. *Journal of Criminal Justice*, 49, 14-21.
- Carcach, C., James, M., & Grabosky, P.N. (1998). Homicide & Older people in Australia. *Australian Institute of Criminology: Trends and issues in crime and criminal justice*, 96, 1-6.
- Chu, L.D., & Kraus, J.F. (2004). Predicting fatal assault among the elderly using the national incident-based reporting system crime data. *Homicide Studies*, 8, 71-95.
- Coelho, L., Ribeiro, T., Dias, R., Santos, A., & Magalhães, T. (2010). Elder homicide in the north of Portugal. *Journal of Forensic and Legal Medicine*, 17, 383-387.
- Collins, K.A. & Presnell, S.E. (2006). Elder homicide: A 20-year study. *American Journal of Forensic Medicine and Pathology*, 27, 183-187.
- Eisner, M. (2008). Modernity strikes back? A historical perspective on the latest increase in interpersonal violence (1960-1990). *International Journal of Conflict and Violence*, 2(2), 288-316.
- Erel, Ö., Aydin-Demirag, S., & Katkici, U. (2011). Homicide and suicide in the elderly: Data from Aydin. *Turkish Journal of Geriatrics*, 14(4), 306-310.
- Falzon, A.L. & Davis, G.G. (1998). A 15-year retrospective review of homicide in the elderly. *Journal of Forensic Sciences*, 43, 371-374.
- Fox, J. A., & Levin, J. (1991). Homicide against the elderly: A research note. *Criminology*, 29, 317-328.
- Henderson, D., Buchanan, J.A., & Fisher, J.E. (2002). Violence and the elderly population: Issues for prevention. In P.A. Schewe (Ed.). *Preventing violence in relationships: Interventions across the life span* (pp.223-245). Washington, DC, US: American Psychological Association.



- Hilal, A., Akçan, R., Eren, A., Turhan, A., & Arslan, M. (2010). Forensic geriatric deaths in Adana, Turkey. *Archives of Gerontology and Geriatrics*, 50, 9-12.
- Innamorati, M., Serafini, G., Lester D., Amore, M., Girardi, P., & Pompili, M. (2014) Violent deaths among Russian and EU male older adults. *International Journal of Social Psychiatry*, 60(1), 89–94.
- Jackson, S.L. (2016). All elder abuse perpetrators are not alike: The heterogeneity of elder abuse perpetrators and implications for intervention. *International Journal of Offender Therapy and Comparative Criminology*, 60(3), 265-285.
- Johannesen, M., & LoGiudie, D. (2013). Elder abuse: A systematic review of risk factors in community-dwelling elders. *Age and Ageing*, 42(3), 292-298.
- Karbeyaz, K., Emiral, E., & Emiral, G.O. (2018). Elder homicide in Eskisehir. *Medicine Science*, 7(2), 299-302.
- Koehler, S.A., Shakir, A.M., & Omalu, B. (2006). Cause of death among elder homicide victims: A 10-year medical examiner review. *Journal of Forensic Nursing*, 2(4), 199-204.
- Krienert, J.L. & Walsh, J.A. (2000). Eldercide: A gendered examination of elderly homicide in the United States, 2000-2005. *Homicide Studies*, 14(1), 52–71.
- Kumar, S. & Verma, A.K. (2016) Audit of burn deaths among older adults in North India – An autopsy-based study. *Egyptian Journal of Forensic Sciences*, 6, 405-10.
- Lachs, M.S. & Pillemer, K. (2015). Elder abuse. *The New England Journal of Medicine*, 373(20), 1947-1956.
- Messner, S.F. & Tardiff, K. (1985). The social ecology of urban homicide: An application of the “routine activities approach”. *Criminology*, 23(2), 241–265.

- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D.G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *British Medical Journal*, 339(7716), 332.
- Office for National Statistics. (2017). *National population projections for the UK, 2016-based statistical bulletin*. Retrieved from <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/nationalpopulationprojections/2016basedstatisticalbulletin#a-growing-number-of-older-people>
- Orimo, H., Ito, H., Suzuki, T., Araki, A., Hosoi, T., & Sawabe, M. (2006). Reviewing the definition of “elderly”. *Geriatrics Gerontology International*, 6, 149-158.
- Pampel, F.C., & Williamson, J.B. (2001). Age patterns of homicide and suicide mortality rates in high income areas. *Social Forces*, 80(1), 251-282.
- Payne, B.K. (2002) An integrated understanding of elder abuse and neglect. *Journal of Criminal Justice*, 30, 535-547.
- Payne, B.K. (2006). *Crime and elder abuse: An integrated perspective* (2nd ed.). Springfield, IL: Charles C Thomas.
- Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., ... Duffy, S. (2006). *Guidance on the conduct of narrative synthesis in systematic reviews. Results of an ESRC funded research project* (unpublished report). Lancaster: University of Lancaster.
- Roberts, A. & Willits, D. (2011). Life, routine activities, and felony-related homicide. *Homicide Studies*, 17(2), 184-203.
- Rogers, M. (2016) Older women’s experiences of domestic violence and abuse. In A. Ahmed and M. Rogers (Eds) *Working with marginalised groups: from policy to practice* (pp.134-149). London: Palgrave Macmillan.

- Rutter, D., Francis, J., Coren, E., & Fisher, M. (2010). *SCIE systematic research reviews: guidelines* (2nd ed.). London: SCIE.
- Safarik, M.E., Jarvis, J.P., & Nussbaum, K.E. (2000). Elderly Female serial sexual homicide: A limited empirical test of criminal investigative analysis. *Homicide Studies*, 4(3), 294-307.
- Safarik, M.E., Jarvis, J.P., & Nussbaum, K.E. (2002). Sexual homicide of elderly females: Linking offender characteristics to victim and crime scene attributes. *Journal of Interpersonal Violence*, 17(5), 500-525.
- Shields, L.B.E., Hunsaker, D.M., & Hunsaker, J.C. (2004). Abuse and neglect: A ten-year review of mortality and morbidity in our elders in a large metropolitan area. *Journal of Forensic Science*, 49(1), 1-6.
- Statistics South Africa. (2017). *Victims of crime survey 2016-17*. Statistical Release PO341. Retrieved from <http://www.statssa.gov.za/publications/P0341/P03412016.pdf>.
- Stevens, J.A., Hasbrouck, L. Durant, T.M., Dellinger, A.M., Batabyal, P.K., Crosby, A.E., Valluru, B.R., Kresnow, M., & Guerrero, J.L. (1999). Surveillance for injuries and violence among older adults. *Morbidity and Mortality Weekly Report: Surveillance Summaries*, 48(8), 27-50.
- Storey, J.E. (in press) Risk Factors for Elder Abuse and Neglect: A Review of the Literature. *Aggression and Violent Behavior*.
- Suffla, S. & Seedat, M. (2016). The epidemiology of homicidal strangulation in the City of Johannesburg, South Africa. *Journal of Forensic and Legal Medicine*, 37, 97-107.
- Timur, O., Tasar, P.T., Ulusoy, M.G., Irez, A., Yildirim, F., Binici, Do.N., Sahin, S., & Kok, A.N. (2017) Autopsies in the elderly: Erzurum study. *Journal of Forensic and Legal Medicine*, 52, 143-147.

- Titterington, V.B., & Reyes, N.C. (2010). Elder homicide in urban America: An exploratory analysis of Chicago, Houston and Miami. *Southwest Journal of Criminal Justice*, 6(3), 228-249.
- Tuttle, J., McCall, P.L., & Land, K.C. (2018). Latent trajectories of cross-national homicide trends: Structural characteristics of underlying groups. *Homicide Studies*, 22(4), 343-369.
- United Nations (2002). *World Population Ageing: 1950-2050*. New York: United Nations.
- United Nations. (2015). *World Population Ageing*. Retrieved from [http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015\\_Report.pdf](http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015_Report.pdf)
- United Nations. (2018). *Ageing*. Retrieved from <http://www.un.org/en/sections/issues-depth/ageing/>
- UNODC. (2013). *The global study on homicide 2013*. Vienna: UNODC.
- US Census Bureau. (2018). *Older people projected to outnumber children for first time in U.S. history*. Release Number CB18-41. Retrieved from <https://www.census.gov/newsroom/press-releases/2018/cb18-41-population-projections.html>
- Weaver, G.S., Martin, C.D., & Petee, T.A. (2004). Culture, context, and homicide of the elderly. *Sociological Inquiry*, 74, 2-19.
- Weiss, D.B., Santos, M.R., Testa, A., & Kuman, S. (2016). The 1990s homicide decline: A western world or international phenomenon? A research note. *Homicide Studies*, 20(4), 321-334.
- Zhu, B., Oritani, S., Ishida, K., Quan, L., Sakoda, S., Fujita, M.Q., & Maeda, H. (2000). Child and elderly victims in forensic autopsy during a recent 5 year period in the

southern half of Osaka city and surrounding areas. *Forensic Science International*, 113, 215–218.

Table 1

*Inclusion and Exclusion Criteria*

	Inclusion	Exclusion
Population	Samples of victims aged $\geq 60$	Samples of victims aged $< 60$
Language	English	Non-English
Time period	1982 to 15 June 2018	Pre-1982
Homicide type	All, including homicide-suicide	N/A
Settings	Victim living in the community	Victim living in institutional setting
Methodology	Qualitative, quantitative and mixed methods studies, evidence reviews.  A minimum sample size of $\geq 10$ for quantitative studies.	Case studies with small samples ( $\leq 10$ ), non-empirical articles (commentary, legal analysis), articles which conflate victim demographics with no clear indication of older victims.

## ELDER HOMICIDE REVIEW

Table 2

### *Summary of Studies Included in the Review*

Authors, publication year & location	Sample size / age ranges	Method of analysis	Method description and data source	Limitations
Abrams et al. (2007), US	$n = 400$ ( $\geq 65$ years) compared to $n = 11,450$ (18-64 years)	Quantitative	Chi-square analyses. All files on homicides in 9-year period within New York city certified by the Office of the Chief Medical Examiner.	No information on offenders or victim-offender relationship.
Addington (2013), US	$n = 6,662$ ( $\geq 65$ years)	Quantitative	Bivariate analyses to compare initial patterns between the use of a single-category (65+) and a multiple-category [(65-74 = young old, 75-84 = aged, 85+ = oldest old) definition of the elderly. Data derived from National Incident-Based Reporting System (NIBRS).	NIBRS does not provide representative samples of states or agencies in the US.
Ahmed et al. (2002), Canada	$n = 67$ (elder homicide) compared with $n = 738$ (nonelderly homicide)	Quantitative	Comparison of elderly homicide offenders with nonelderly homicide offenders. Chi-square analyses. Retrospective review of Canadian Police Information Centre (CPIC) data and data derived from other Criminal Justice agencies. Data from adult homicide offenders (National Parole Board database).	Focus on offenders, victims are described.
Akar et al. (2014), Turkey	$n = 1,324$ elderly deaths (84 homicides) ( $\geq 65$ years)	Quantitative	Analysis of the records of the public prosecutor office, crime scene investigation, autopsy findings (Morgue Department of the Council of Forensic Medicine).	Limited information and focus is generally on all deaths (not specifically homicide). Homicide method seems to vary by gender, though no further context or analysis provided.
Block (2013), US	$n = 25,308$ (all ages) 6.4% $\geq 60$ years	Quantitative	Case records of victims, offenders and demographic data provided by the City of Chicago (Chicago Homicide Dataset).	No detail/definition on elder abuse/elder homicide. Partial reporting for some results.
Blom et al. (2011), South Africa	$n = 304$ (all cases regardless of age) ( $\geq 55$ years)	Quantitative	Cross-sectional study investigating region-specific data gathered at mortuaries. Data from the National Injury Mortality Surveillance System.	Partial reporting for some results. Data not presented by age and manner of death, thus provided limited detail about elderly homicide.
Burgess et al. (2005), US	$n = 26$ (62-90 years) compared to $n = 27$ (30-58 years)	Mixed method	Case records and autopsy results. Chi-square analyses. Data derived from Coroner's office.	Small sample size.

## ELDER HOMICIDE REVIEW

Buschmann et al. (2016), Germany	<i>n</i> = 55 (from a total of 480 homicides) (≥ 60 years)	Quantitative	Retrospective evaluation of data derived from autopsy reports, police investigation files and court documents.	Some data missing or reported for a larger sample of 93 individuals, all of who were not 60 years or older. Small sample of individuals aged 60 years and older. Statistical tests may have been run but are not specified.
Buthelezi et al. (2017), South Africa	<i>n</i> = 557 (≥ 60 years)	Quantitative	Retrospective cross-sectional study. Chi-square analyses used to identify eldercide differences. Data derived from the National Injury Mortality Surveillance System.	Missing data is high for some variables (e.g., scene of death) and for some victims' ages in the database (leading to underrepresentation of eldercide rates). No information on offenders or their relationship to the victim.
Carcach et al. (1998), Australia	<i>n</i> = 164 (≥ 65 years)	Quantitative	Comparison of elderly with nonelderly victims. Data derived from the National Homicide Monitoring Program.	Does not specify statistical analyses but appears to have set statistical significance at 0.1. Unclear incident detail (e.g., no clarity in use of terms 'altercations' and 'disputes').
Chu & Kraus (2004), US	<i>n</i> = 371 (≥ 65 years)	Quantitative	Chi-square analyses used to detect differences between homicides and assaults for elderly victims and victims of all age groups. Analyses stratified over different covariates to identify confounders and variable interactions. Logistic regression used to predict the outcome of death of victims from serious assaults. Data derived from the National Incident-Based Reporting System.	Data is limited to fatality following assault. Large amount of missing data. NIBRS does not provide representative samples of states or US agencies.
Coelho et al. (2010), Portugal	<i>n</i> = 78 (≥ 65 years)	Quantitative	Retrospective analysis of autopsy reports. Non-parametric tests. Autopsy reports and data retrieved from the National Institute of Legal Medicine.	Small sample size. Some variables included a large amount of missing data.
Collins & Presnell (2006), US	<i>n</i> = 127 homicides (from a total of 2137 deaths examined) (≥ 65 years)	Quantitative	Homicide data were extracted and analysed from cases referred to the Forensic Section of the Department of Pathology and Laboratory Medicine at the Medical University of South Carolina.	Significant differences are referred to in the text but not statistical information is presented.
Erel et al. (2011), Turkey	<i>n</i> = 148 (≥ 65 years)	Quantitative	Data derived from the Department of Forensic Medicine. Autopsy reports were used and descriptive statistics provided. Chi-square tests used for analysis.	Methodological limitations e.g. most data were reported for all elderly deaths (homicide or otherwise) and homicide cases were not distinguishable.



## ELDER HOMICIDE REVIEW

Falzon & Davis (1998), US	$n = 150$ ( $\geq 65$ years). Some comparisons to nonelderly victims ( $n = 2062$ )	Quantitative	Retrospective review of deaths recorded at the Jefferson County Coroner Office. Reviewed investigative reports, autopsy findings, and toxicological analysis. Data for these cases was compared with nonelderly cases during the same period.	Limited information on the specific cases or how motives were categorised. Some comparisons were not reported or supported with data.
Hilal et al. (2010), Turkey	$n = 726$ ( $\geq 65$ years)	Quantitative	Records of public prosecutors, crime or death scene investigation, autopsy and laboratory findings reviewed. Data derived from the Forensic Medicine Institution Group Authority Morgue Specialty Office.	Very little information is provided on homicide as the focus is on all deaths not exclusively on homicide.
Innamorati et al. (2014), EU, Russia	All elderly deaths ( $\geq 65$ years)	Quantitative	Examined temporal trends since 1985 in age-adjusted suicide and homicide rates for elderly male residents of the EU and the Russian Federation. Estimated relative risks and used loglinear jointpoint regression models. Data derived from a database categorised by early EU members (members before 2004), new EU members (after 2004), and Russian federation (the WHO European Mortality database).	Sample size is not provided. Database contains exclusively mortality-based indicators and is supplement to the generic European health-for-all database.
Karbeyaz et al. (2018), Turkey	$n = 13$ ( $\geq 65$ years)	Quantitative	Review of case files and investigation papers from the Directorate of Forensic Medicine. Chi-square analyses used for comparisons. .	Authors state that Chi-square analyses were performed but they are not presented in the results. Small and local sample size. Limited description of how causes of death were classified or determined. Some variables referred to in the method are not included in the results.
Koehler et al. (2006), US	$n = 49$ ( $\geq 65$ years)	Quantitative	Autopsy reports, toxicology reports, death certificates, and death investigation reports were reviewed. Data derived from the Medical Examiner's Office.	Small and local sample. Limited description of methodology. Limited data reported: some variables that are reported to have been analysed are not reported in the results. Limited description of methodology.
Krienert & Walsh (2010), US	$n = 828$ ( $\geq 60$ years)	Quantitative	Data were limited to cases with a single offender for each victim. Descriptive statistics to assess offender, victim and incident-level eldercide characteristics. Chi-square, logistic regression. Data derived from NIBRS.	NIBRS does not provide representative sample of states or agencies in the US
Kristoffersen et al. (2014), Norway	$n = 196$ (all ages) ( $\geq 60$ years)	Quantitative	Data obtained and analysed retrospectively from postmortem reports. Data derived from the Gade Laboratory for Pathology, University of Bergen.	Limited info on the elderly homicides.

## ELDER HOMICIDE REVIEW

Kumar & Verma (2016), India	<i>n</i> = 2,695 (deaths due to burns) (≥ 60 years)	Quantitative	Data regarding deaths caused by burns were derived from autopsy reports from King George's Medical University.	Limited information on the homicide cases and focus was limited to deaths caused by burns.
Nomura et al. (2016), Japan	<i>n</i> = 297 (all unnatural deaths) (≥ 65 years)	Quantitative	Two cohorts of victims constituted the sample: people who lived alone and those who lived with their family. Comparison between "old" cases (1989-1993) and recent ones (2009-2013). Data derived from forensic autopsy records.	Limited information on the homicide cases utilised.
Pampel & Williamson (2001), multi-state	Aggregate-level data (≥ 65 years)	Quantitative	Use of aggregate-level data derived from World Health Organisation Reports. Includes number of homicide deaths and measures of relative rates of homicide or differences in rates across age groups. Data.	Aggregate-level data: does not provide much detail on characteristics.
Roberts & Willits (2011), US	<i>n</i> = 1391 (≥ 65 years)	Quantitative	Examination of the relationship between lifestyle and daily activity measures (using of Census data) and eldercide (calculated using Fox & Swatt's dataset). Use of a negative binomial log-rate.	Limited categories used to classify deaths.
Safarik et al. (2000), US	<i>n</i> = 33 (≥ 60 years)	Quantitative	Based on the principles of criminal investigative analysis, cases of serial sexual homicide of elderly females were examined. Logistic regression used to analyse the data. Data derived from the FBI's National Center for the Analysis of Violent Crime (NCAVC).	Means and standard deviations are not interpretable as they are calculated on categorial variables. Logistic regression mainly to investigate the usefulness of criminal investigative analysis.
Safarik et al. (2002), US	<i>n</i> = 128 (and 604 cases from the SHR) (≥ 60 years)	Mixed Method	Comprehensive review of homicide records including sexual homicide. Logistic regression used to analyse the data. Data derived from FBI Supplemental Homicide Reports, and NCAVC.	Results reported in such a way that it is unclear which are being reported (i.e., all cases, sexual homicides only or NCAVC cases only). Logistic regression mainly to investigate the usefulness of criminal investigative analysis.
Shields et al. (2004), US	<i>n</i> = 74 (≥ 60 years)	Quantitative	Examination of postmortem cases and living subjects to present the characteristic features of elder abuse in post-mortem and living cases. Data derived from State Medical Examiner's Office.	Many 'undetermined' offender cases. Small sample size.

## ELDER HOMICIDE REVIEW

Stevens et al. (1999), US	Sampled size not provided ( $\geq 65$ years)	Quantitative	Medical certification of death records analysed. National Center for Health Statistics (NCHS) annual mortality data was supplemented with data from the FBI's Supplemental Homicide Reports.	Unable to identify sample size as reporting only includes homicide rates per 100,000 persons. Few aspects reported, and only partial information is given: e.g. FBI-SHR data of homicide method reported only for 1996.
Suffla & Seedat (2016), South Africa	$n = 334$ (Vs of all ages) ( $\geq 60$ years)	Quantitative	Register-based cross-sectional study of homicidal strangulation. Age-specific mortality rates by homicidal strangulation calculated. Data derived from the National Injury Mortality Surveillance System	Focuses only on death by strangulation.
Timur et al. (2017), Turkey	$n = 399$ (all deaths) ( $\geq 65$ years)	Quantitative	Autopsy reports and prosecution documents were reviewed retrospectively. Data derived from Morgue Specialization Department of the Forensic Medicine Institute, Erzurum Division.	Limited information provided.
Tittinger & Reyes (2010), US	$n = 537$ ( $\geq 65$ years) out of 14,262 cases of which the victim age was known.	Quantitative	Records of homicide incidents: combination of police murder logs and narratives, personal interviews, and newspaper accounts. Chi-square tests used to analyse the data. Sample includes multi-city homicide data compiled by the National Consortium on Violence Research, Data Center at Carnegie-Mellon University.	Large amount of missing data.
Zhu et al. (2000), Japan	$n = 121$ ( $\geq 65$ years)	Quantitative	Retrospective investigation from forensic autopsy cases.	Methodology not detailed. Small sample size once accidental cases are excluded. No statistical tests completed.

Figure 1 PRISMA diagram

